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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
LARKIN, DANIEL SEAN	

ART UNIT	PAPER NUMBER
2856	

DATE MAILED: 08/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/748,526	BERLIN ET AL.	
	Examiner	Art Unit	
	Daniel S. Larkin	2856	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 June 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-37* is/are pending in the application.

4a) Of the above claim(s) *5-11,16-19,25-29 and 34-37* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,12-15,20-24,30,and 33* is/are rejected.

7)☒ Claim(s) *31 AND 32* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 December 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of claims and 1-4, 12-15, 20-24, and 30-33 in the reply filed on 06 June 2005 is acknowledged.

2. Claims 5-11, 16-19, 25-29, and 34-37 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 06 June 2005.

Drawings

3. Figures 1-5, 8, and 9 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. These drawing figures are the same as Figures 1-4B, 5 and 6 presented in application 10/067,029, filed 04 February 2002, more than one year prior to the filing of this application. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

4. The disclosure is objected to because of the following informalities:

Page 7, paragraph [0030], line 5: The abbreviation "AFT" should be corrected to read -- AFM --.

Page 8, paragraph [0033], line 6: A -- comma -- should be inserted prior to the term "such".

Page 8, paragraph [0034], line 1: The space between the letters "b" and "y" should be deleted.

Page 11, top of page: The term "CLAIMS" should be replaced with a phrase, such as "What Is Claimed Is:" or "What We Claim Is:". Appropriate correction is required.

5. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

The specification fails to provide antecedent basis for the term "organic elements" in disclosing the makeup of the nanocodes as recited in claim 30.

The specification fails to provide antecedent basis for the term "inorganic elements" in disclosing the makeup of the nanocodes as recited in claim 31.

The specification fails to provide antecedent basis for the term "biochemical elements" in disclosing the makeup of the nanocodes as recited in claim 32.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-4, 12-15, 20-23, 30, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2004/0058328 (Chen et al.) in view of US 2003/0033863 (Ashby et al.)

With respect to the limitations of claim 1, the reference to Chan et al. discloses an apparatus for detection, identification, and sequencing of biomolecules, comprising: a probe molecule (410) attached to a nanobarcode (420) comprised of a plurality of carbon nanotubes or fullerenes. The reference further discloses that that the nanobarcodes (420), coded probes, and/or target molecules may be attached to a surface and aligned for analysis by scanning probe microscopy (see paragraph [0023], lines 1-4 and 9-12).

The reference to Chan et al. fails to disclose using a scanning array for simultaneously scanning the molecules. The reference to Ashby et al. discloses an atomic force microscope for use in screening potential interactions between biological molecules comprised of an array of scanning probe tips, as shown in Figure 8. Additionally, the reference to Ashby et al. discloses that the AFM probe array, the individual probes, the surface, or a combination of the above may have independent means for position control (see paragraph [0043], lines 1-3). Providing a scanning array

for simultaneous scanning would have been obvious to one of ordinary skill in the art as means of more quickly detecting and identifying a plurality of molecular samples.

With respect to the limitation of claim 2, the reference to Chan et al. discloses that cantilever torsion of the atomic force microscope will be dependent upon the frictional characteristics of the surface; and the different coded probes can be detected and identified by lateral force microscopy since the frictional characteristics of the coded probes will be different base upon their compositions (see paragraph [0092]).

With respect to the limitation of claim 3, the reference to Chan et al. fails to disclose a scanning array comprising two or more AFM tips. The reference to Ashby et al. discloses an atomic force microscope comprised of an array of two or more scanning probe tips, as shown in Figure 8. Providing a scanning array having multiple scanning tips would have been obvious to one of ordinary skill in the art as means of more quickly detecting and identifying a plurality of molecular samples.

With respect to the limitation of claim 13, the reference to Chan et al. fails to expressly disclose the presence of a substrate holder. The reference to Ashby et al. discloses that means of holding or supporting a substrate/sample is well known in the art as evidenced by Figure 4B. Providing a substrate/sample holder would have been obvious to one of ordinary skill in the art as a means of providing support of the sample as well as a means of moving the sample with respect to the probe array, which in turn help with positioning the probe array with respect to the sample under test.

With respect to the limitation of claim 12, the reference to Chan et al. discloses that the molecules to be detected may include nucleic acid molecules that may be naturally occurring DNA molecules (see paragraph [0030]).

With respect to the limitation of claim 13, the reference to Chan et al. fails to expressly disclose the presence of a substrate holder. The reference to Ashby et al. discloses that means of holding or supporting a substrate/sample is well known in the art as evidenced by Figure 4B. Providing a substrate/sample holder would have been obvious to one of ordinary skill in the art as a means of providing support of the sample as well as a means of moving the sample with respect to the probe array, which in turn help with positioning the probe array with respect to the sample under test.

With respect to the limitation of claim 14, the reference to Chan et al. discloses using a linking group, i.e. molecular assay, as a means to avoid steric hindrance between a nucleotide and a fullerene with hybridization to target nucleic acids.

With respect to the limitations of claim 15, the reference to Chan et al. discloses an apparatus for detection, identification, and sequencing of biomolecules, comprising: a probe molecule (410) attached to a nanobarcode (420) comprised of a plurality of carbon nanotubes or fullerenes. The reference further discloses that that the nanobarcodes (420), coded probes, and/or target molecules may be attached to a surface and aligned for analysis by scanning probe microscopy (see paragraph [0023], lines 1-4 and 9-12).

The reference to Chan et al. fails to expressly disclose moving the scanning probe relative to the substrate/sample. It is the examiner's position, however, that

movement of the probe with respect to the substrate/sample is very well known in the atomic force/scanning probe microscopy art as a means of properly positioning the sample with respect to the sample. The reference to Chen et al further fails to disclose using a scanning array or a substrate holder. The reference to Ashby et al. discloses an atomic force microscope for use in screening potential interactions between biological molecules comprised of an array of scanning probe tips, as shown in Figure 8. Providing a scanning array would have been obvious to one of ordinary skill in the art as means of more quickly detecting and identifying a plurality of molecular samples. The reference to Ashby et al. discloses that means of holding or supporting a substrate/sample is well known in the art as evidenced by Figure 4B. Providing a substrate/sample holder would have been obvious to one of ordinary skill in the art as a means of providing support of the sample. Additionally, the reference to Ashby et al. discloses that the AFM probe array, the individual probes, the surface, or a combination of the above may have independent means for position control (see paragraph [0043], lines 1-3). Providing a scanning means for the probe array would have been obvious to one of ordinary skill in the art as a means of providing the apparatus with greater accuracy and precision in moving the probe array with respect to the sample under test.

With respect to the limitations of claim 20, the reference to Chan et al. discloses a method for detection, identification, and sequencing of biomolecules, comprising: providing a probe molecule (410) attached to a nanobarcode (420) comprised of a plurality of carbon nanotubes or fullerenes. The reference further discloses that that the nanobarcodes (420), coded probes, and/or target molecules may be attached to a

surface and aligned for analysis by scanning probe microscopy (see paragraph [0023], lines 1-4 and 9-12).

The reference to Chan et al. fails to disclose using a scanning array to simultaneously scan the molecules. The reference to Ashby et al. discloses an atomic force microscope for use in screening potential interactions between biological molecules comprised of an array of scanning probe tips, as shown in Figure 8. Additionally, the reference to Ashby et al. discloses that the AFM probe array, the individual probes, the surface, or a combination of the above may have independent means for position control (see paragraph [0043], lines 1-3). Providing a scanning array for simultaneous scanning would have been obvious to one of ordinary skill in the art as means of more quickly detecting and identifying a plurality of molecular samples.

With respect to the limitations of claim 21, both the references to Chan et al. and Ashby et al. disclose receiving the scanned information from the probes with an analyzing means; and further providing means for identifying the molecules associated with the specific substrates or nanobarcodes.

With respect to the limitation of claim 22, the reference to Chan et al. discloses that cantilever torsion of the atomic force microscope will be dependent upon the frictional characteristics of the surface; and the different coded probes can be detected and identified by lateral force microscopy since the frictional characteristics of the coded probes will be different base upon their compositions (see paragraph [0092]).

With respect to the limitation of claim 23, the reference to Chan et al. fails to discloses a scanning array comprising two or more AFM tips. The reference to Ashby

et al. discloses an atomic force microscope comprised of an array of two or more scanning probe tips, as shown in Figure 8. Providing a scanning array having multiple scanning tips would have been obvious to one of ordinary skill in the art as means of more quickly detecting and identifying a plurality of molecular samples.

With respect to the limitation of claim 30, the reference to Chan et al. appears to disclose that all of the materials forming the scanned compositions are comprised of organic materials, such as carbon nanotubes and DNA molecules.

With respect to the limitations of claim 33, the reference to Chan et al. discloses a method for detection, identification, and sequencing of biomolecules, comprising: providing a probe molecule (410) attached to a nanobarcode (420) comprised of a plurality of carbon nanotubes or fullerenes. The reference further discloses that that the nanobarcodes (420), coded probes, and/or target molecules may be attached to a surface and aligned for analysis by scanning probe microscopy (see paragraph [0023], lines 1-4 and 9-12).

The reference to Chan et al. fails to disclose using a scanning array having two or more tips to simultaneously scan the molecules. The reference to Ashby et al. discloses an atomic force microscope for use in screening potential interactions between biological molecules comprised of an array of scanning probe tips, as shown in Figure 8. Additionally, the reference to Ashby et al. discloses that the AFM probe array, the individual probes, the surface, or a combination of the above may have independent means for position control (see paragraph [0043], lines 1-3). Providing a scanning array

for simultaneous scanning would have been obvious to one of ordinary skill in the art as means of more quickly detecting and identifying a plurality of molecular samples.

8. Claims 4 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2004/0058328 (Chen et al.) in view of US 2003/0033863 (Ashby et al.) as applied to claims 3 and 23 above, and further in view of US 5,047,633 (Finlan et al.).

With respect to the limitation of claim 3, the references to Chan et al. and Ashby et al. both fail to expressly recite that the scanning array is a three by three array. The reference to Finlan et al. discloses an apparatus for imaging macromolecules and interactions involving macromolecules, whereby an array of probes (13) is utilized to perform the imaging. One example, as shown in Figure 4, shows a four by four array of scanning probes. It is the examiner's position that one of ordinary skill in the art would have the requisite ability to create a scanning array as large or as small as the operator wishes in order to take advantage of the number of sample needed to be scanned, as well as to more quickly scan a plurality of samples.

With respect to the limitation of claim 24, the references to Chan et al. and Ashby et al. both fail to expressly recite that the scanning array is a three by three array. The reference to Finlan et al. discloses a method of imaging macromolecules and interactions involving macromolecules, whereby an array of probes (13) is utilized to perform the imaging. One example, as shown in Figure 4, shows a four by four array of scanning probes. It is the examiner's position that one of ordinary skill in the art would have the requisite ability to create a scanning array as large or as small as the operator

wishes in order to take advantage of the number of sample needed to be scanned, as well as to more quickly scan a plurality of samples.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The prior art to US 2002/0172963 (Kelley et al.) discloses biological sensing devices formed by providing a substrate having an array of carbon nanotubes formed thereon, whereby biological molecules are chemically attached to the nanotubes.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel S. Larkin whose telephone number is 571-272-2198. The examiner can normally be reached on 8:00 AM - 5:00 PM Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on 571-272-2208. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Daniel Larkin
AU 2856
17 August 2005

DANIEL S. LARKIN
PRIMARY EXAMINER